June 23, 1959 W. A. DUNCAN 2,891,371

LAWN MOWER

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Fig. 1

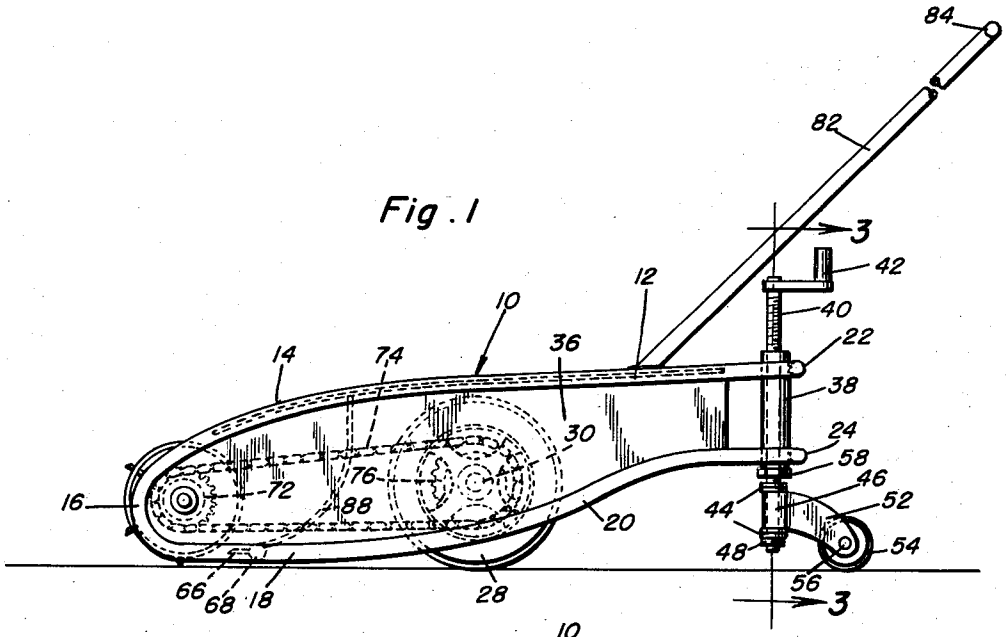


Fig. 2

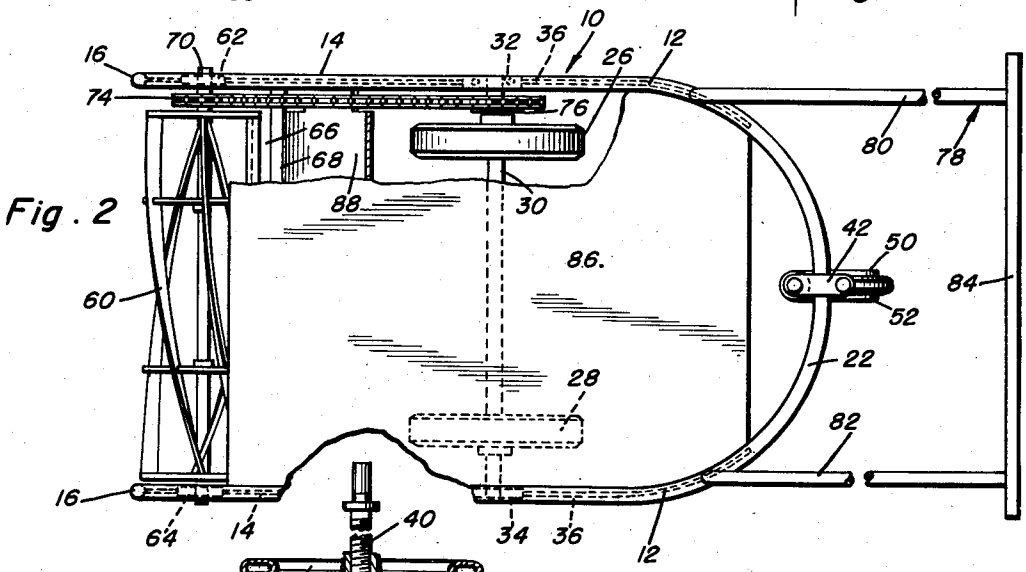
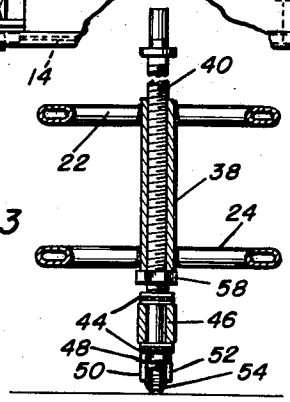


Fig. 3



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Fig. 4

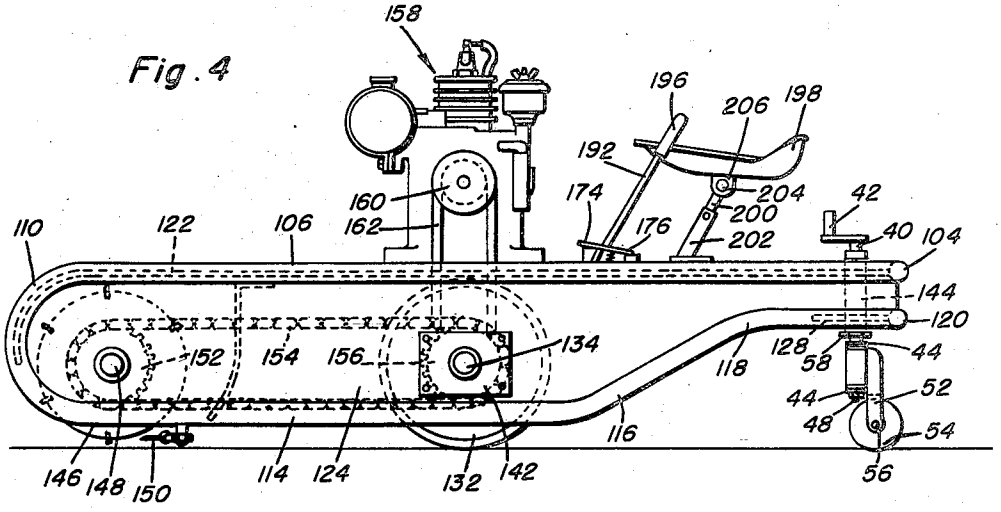
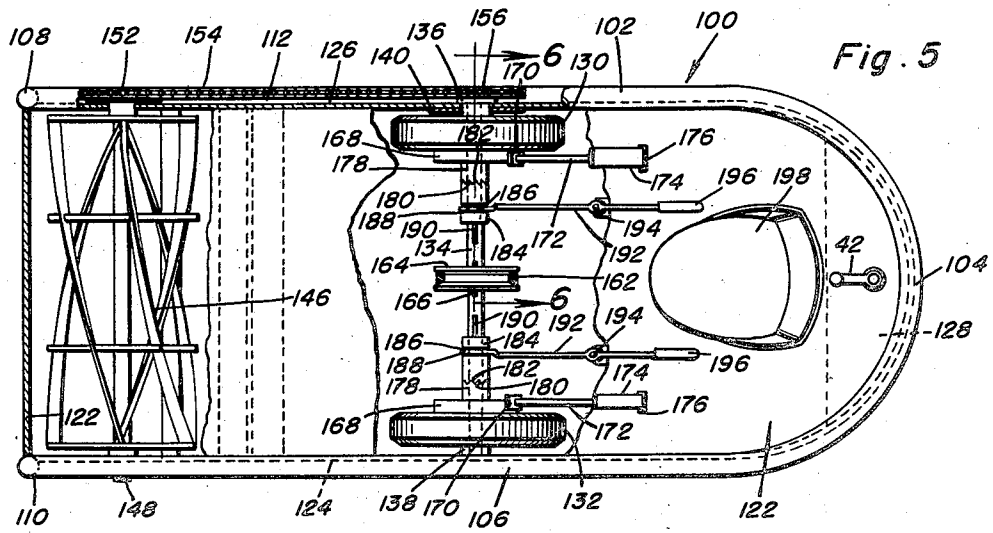


Fig. 5



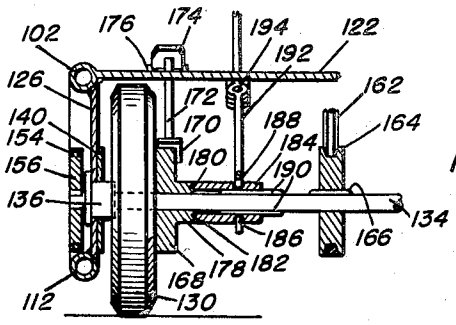


Fig. 6

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LAWN MOWER

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4 Claims. (Cl. 56—252)

This invention relates in general to lawn mowers and more particularly to an improved lawn mower suspension and cutting height adjustment.

The primary object of this invention is to provide a lawn mover, either manually operated or motor driven, having a novel three-wheel suspension which may be easily adjusted to provide the cutting height of the reel of the lawn mower.

A further object of this invention is to provide a lawn mower of the reel type which will mow the lawn in close proximity to buildings and fences, thus making it unnecessary to trim the edges of the lawn.

A further object of this invention is to provide a power driven lawn mower which may be ridden by the operator and which has a novel steering arrangement.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a side elevation of a hand operated lawn mower, with portions of the mower shown in dotted lines to more clearly define the structure therein;

Figure 2 is a top plan view of the lawn mower shown in Figure 1, with portions broken away for clarity;

Figure 3 is an enlarged sectional view taken substantially along section line 3—3 of Figure 1 which illustrates the height adjusting feature of the mower;

Figure 4 is a side elevation of a second embodiment of the invention, which is power operated and ridden by the operator;

Figure 5 is a top plan view of the mower shown in Figure 4 with portions broken away to clearly show a clutch and brake mechanism of the mower;

Figure 6 is an enlarged sectional view taken substantially along section line 6—6 of Figure 5 to show all of the features of the clutch and brake assembly in detail.

Referring now to the drawings in detail, it will be seen that the lawn mower consists of a tubular frame, which is referred to in general by the reference numeral **10**. The frame **10**, when viewed from above, appears U-shaped in configuration, with the open end of the U being to the front or forward part of the mower. The frame **10** consists of one continuous tubular element, which when viewed from the side has a substantially horizontal upper member **12** comprising a pair of reaches which extends toward the front of the mower and which reaches at their forward ends curve downward slightly, as at **14**, and then terminate in U-bends **16** which are at the extreme forward end of the mower. The U-bends **16** terminate in a lower horizontal frame member **18** also comprising a pair of reaches and which extend toward the rear of the mower and curve upwardly, as at **20**. It should be understood that the portions **18** and **20** of the lower member underlie the portions **14** and **12** of the upper member, with the portions **12** and **20** terminating in horizontal bight portions **22** and **24**, respectively. Inasmuch as both

sides of the frame **10** are identical in construction and configuration, like reference numerals have been used for identification thereof. The frame **10** is carried by a pair of ground-engaging wheels **26** and **28** which are disposed on a transverse axle **30**. The axle **30** is approximately midway between the forward and rear end of the mower. The axle **30** is attached to the frame **10** at each side thereof by means of journals **32** and **34** which, in turn, are carried by a vertical upstanding sheet metal wall **36**. The sheet metal wall **36** extends between the upper and lower frame members and from the nose **16** backward, where it terminates adjacent to the upper member **12**. It should be understood that the wheels **26** and **28** are fixed on the shaft **30**.

The bight portions **22** and **24** have extending therebetween, at the approximate longitudinal center line of the mower, a vertical sleeve **38**. The sleeve **38** is internally threaded and receives therein an elongated adjusting screw **40**. The adjusting screw **40** has attached at its upper end a hand crank **42**. The screw **40** at the lower end thereof has a reduced portion on which there is disposed a pair of thrust bearings **44** with a tubular member **46** therebetween. It should be noted that the thrust bearings **44** and the tubular member **46** are maintained in position on the screw **40** by means of a retainer nut **48** disposed on the lower end of the screw **40**. The tubular member **46** has formed integral therewith a pair of downwardly and outwardly extending ears **50** and **52**, which are in parallel spaced relation and receive therebetween a dolly wheel **54** carried on an axle **56**. It should be noted in Figure 3 that the adjusting screw **40**, intermediate the lower end of the vertical member **38** and the upper thrust bearing, is provided with a lock nut **58**. It should be readily understood that the screw **40** may be prevented from rotating with relation to the sleeve **38** by means of tightening the lock nut **58** against the lower shoulder of the sleeve **38**.

Closely adjacent to the forward end of the mower there is provided a reel type cutter **60** which is journaled in bearing blocks **62** and **64**, also carried by the side plates **36**. As is best seen in Figure 1, a cutter bar **66**, closely adjacent to the reel blades and carried by a cylindrical transverse bar **68**, is provided below and to the rear of the reel **60**. Inasmuch as the structure of the reel and the cutter bar is conventional in nature, it will not be described in detail. It should be noted, however, that the shaft **70**, which has the reel **60** attached thereto, also carries a sprocket **72** which is engaged by an endless chain **74**, which in turn engages a second sprocket **76** which is fixed to the shaft **30**. It should be noted that the mower is also provided with a push type handle, which is referred to in general by the reference numeral **78** and has two upwardly and backwardly extending tubular members **80** and **82** which terminate in a transverse horizontal push bar **84**.

In addition to the side plates **36**, the mower is also provided with an upper cover **86** and a grass cutting guard **88** which curves upward and backward from the transverse tube **68** to the cover **86**.

Referring now to Figures 4, 5 and 6, which show a second embodiment of the invention, which is a power operated, riding type mower. It will be noted that the riding mower consists of a frame, which is referred to in general by the reference numeral **100**, and when viewed in plan consists of a U-frame having an upper horizontal tubular straight portion **102**, a rear bight portion **104**, and a second straight portion which comprises the left side of the mower **106**. When viewed in side elevation, the portions **102** and **106** terminate in reverse bends **108** and **110**, respectively, which in turn terminate in lower horizontal members **112** and **114**, respectively. The lower member **114** terminates in an angular bend **116** and then

proceeds upward and backward at an angle to a second bend **118**, which in turn terminates in a second U-bend **120**, which is in underlying relation to the U-bend **104** and parallel in a horizontal plane thereto. To strengthen and reinforce the frame **100** and to carry a power plant, operating levers and the operator's seat, all of which will be described in more detail hereinafter, there is provided a heavy gauge sheet metal floor plate **122** which conforms to the shape of the upper portions of the frame **100** and is welded or otherwise suitably attached thereto. The plate **122** extends from U-bends **110** to the U-bend **104** and is of sufficient strength to reinforce the frame **100** and carry the necessary weight thereon. To further strengthen the frame **100**, vertical side plates **124** and **126** are provided. The side plates **124** and **126** extend from the U-bends **110** and **108**, respectively, back to the center of the U-bend **104**, conforming to the vertical shape and spacing between the side members **102** and **112** and the side members **106** and **114**. A third plate member **128** is disposed in the U-portion **120**, being semicircular in configuration and suitably attached to the frame, as by welding. The purpose of this plate is to be described hereinafter.

The mower is supported by a right wheel **130** and a left wheel **132** which are carried on a transverse axle **134** which in turn is carried by journals **136** and **138** and journal plates **140** and **142**, respectively. The journal plates **140** and **142** are suitably attached to the vertical side members **126** and **124** respectively. It should be understood that the axle **134** is disposed, with relation to the frame, so as to allow most of the weight to be to the rear thereof.

At the rear of the mower and carried by the plates **122** and **128** there is provided a vertically disposed sleeve **144**. Inasmuch as the sleeve **144** is identical with and carries structure which serves the same purpose as the structure which is carried by sleeve **38** in the first embodiment, as shown in Figures 1 through 3, this portion of the power mower will not be described, but like numerals will be used thereon.

There is provided at the forward end of the mower a reel type cutter **146**, which is attached to a transverse shaft **148** which is parallel to the shaft **134**. The shaft **148** is suitably journaled in the side plates **124** and **126**. There is provided to the rear of and below the reel type cutter a cutter bar **150**. The cutter bar **150** is adjustably attached to the frame members **112** and **114**, in any suitable manner such as that shown in Godwin, 2,335,054. Attached to the right end of the reel shaft **148** there is a driven sprocket **152** which is drivingly engaged by an endless chain **154**. The chain **154** is driven by means of drive sprocket **156** which is fixed to shaft **134**.

The plate **122** carries a suitable power source, which is referred to in general by the reference numeral **158**, and is drivingly connected to the shaft **134** by means of a drive pulley **160**, an endless V-belt **162** and a driven pulley **164**. The driven pulley **164** is keyed to the shaft **134** by means of a key **166**. While a gasoline engine is shown as the type of power used, it should be understood that electric or other suitable power could be used instead.

Inasmuch as both the right and left wheels **130** and **132** are driven, clutched, declutched and braked by identical mechanisms, the structure and operation of one wheel only will be described and like reference numerals used on both wheels. Referring now to Figure 6, it will be noted that the right wheel **130** is shown. The wheel **130** is free to rotate on the axle **134** and has attached thereto a brake disk **168** which is engageable by a brake shoe **170** which is foot operated by means of a brake rod **172**. The brake rod **172** extends upward through the plate **122** and is attached to a foot pedal **174**, which is pivotally attached, as at **176**, to the plate **122**. The brake disk **168** terminates in an inwardly extending, reduced portion **178**. The portion **178** terminates in a serrated face **180**. Serrated radial teeth **180** are engageable by matching serrated teeth **182** of a combined dog clutch throw out bearing bushing **184**. The bushing **184** is provided with a circumferential groove **186** which is engaged by a throw out yoke **188**. It should be understood that the throw out bushing **184** is laterally slidable on the shaft **134**, but drivingly connected thereto by means of keys **190** or splines or other suitable means. The throw out yoke is formed integral with an operating rod **192** which is pivotally attached below the plate **122** to that plate by means of a pivot pin **194**. The upper end of the operating rod **192** is provided with a suitable hand grip **196**.

Mounted to the rear of and in such a position as to be convenient for the operator to operate the brake pedals **174** and the clutch handle **196**, there is provided a seat **198** which is adjustably attached to the plate **122** by means of a vertical rod **200** which is telescopically received in a socket **202** at the lower end thereof.

The socket **202** is fixed to the plate **122**. The upper end of the rod **200** is pivotally attached to the seat **198** by means of a pivot pin **204** which extends through the rod **200** and a pair of bifurcated, depending ears **206**.

While the operation of either embodiment of the invention should be obvious, a brief description of the manner in which the height of cut may be adjusted will now be described. First, it should be understood that a three-point support for both mowers is provided by means of the traction wheels and the single wheel **54** of the dolly, both mowers being so balanced as to have the greatest percentage of weight towards the rear of the mower. When the operator is desirous of changing the height of cut of the grass to be cut, it is merely necessary to loosen the lock nut **58**, grasp the crank **42** and turn in the direction desired. In this manner, the rear of the mower is raised or lowered, with the axle **30** or **134** providing the pivot point, thereby lowering or raising the front end of the mower and the cutter bar. After the desired height is reached, the screw **40** may be locked by means of the lock nut **58**.

When operating the second embodiment of the invention, that is, the riding mover, both clutches may be disengaged, the power unit started and then, if a straight cut is desired, both clutches may be engaged. When a gradual turn is desired, the clutch on that particular side may be disengaged and the mower, due to the driving force of the opposite wheel, will turn in that direction. However, if a sharp turn is desired, the clutch may be disengaged and the brake applied at the same time on that particular side, thus causing the mower to pivot somewhat on that wheel.

It should be noted that in all embodiments of the invention there are no projections outside of the frame, thereby lessening the chance of scarring trees, buildings or fences when utilizing the mowers.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A lawn mower comprising a frame, a rotatable cutter blade assembly rotatably journaled on the front end of said frame and disposed beneath the front end thereof, an axle provided with support wheels rigidly secured thereto, said axle being journaled on the mid-portion of said frame, driving means operatively connecting said axle to said cutter blade assembly, means connected to said frame for effecting rotation of said axle and thereby of said cutter blade assembly, said frame having upper and lower rearwardly projecting frame members, a support dolly mounted on the rear portion of said frame members, means connected to said

frame and dolly for vertical adjustment of said dolly, said last mentioned means comprising an internally threaded vertical sleeve secured to and disposed between said frame members, an adjusting shaft threaded in and extending through said sleeve, said dolly being swiveled on the lower end of said adjusting shaft, said frame comprising a continuous elongated tube, said members having upper and lower pairs of reaches extending longitudinally on both sides of the device, each pair of upper and each pair of lower reaches being connected at the rear end by a continuously curved section of tubing, said upper and said lower reaches on each side being connected to each other at the front end by a continuously curved section of tubing.

2. The combination of claim 1 including a wall disposed between and fixedly secured to the surfaces of said upper and lower frame reaches.

3. The combination of claim 2 including an upper cover fixedly secured to and disposed between said upper reaches and substantially enclosing the upper portion of the frame.

4. The combination of claim 3 wherein said means for effecting rotation of said axle comprises a push type

handle having two upwardly and backwardly extending tubular members connected to the rear portion of said frame, said tubular members terminating in a transverse horizontal push bar which when pushed will cause frictional engagement of the wheels with their supporting surface, thereby causing the wheels to rotate.

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